

# PATENT SPECIFICATION

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- (21) Application No. 30489/73 (22) Filed 27 June 1973  
 (31) Convention Application No. 65 485/72 (32) Filed 36 June 1972 in  
 (33) Japan (JA)  
 (44) Complete Specification published 20 Nov. 1974  
 (51) International Classification B65D 75/30//81/20  
 (52) Index at acceptance  
 B8C 19L 21A1 24A 24B6B 25D  
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## (54) PACKAGE

(71) We, JINTAN TERUMO COMPANY LIMITED, a Japanese corporate body, of 44-1, 2-chome, Hatagaya, Shibuya-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to improvements in packaging particularly for articles such as surgical instruments.

A known technique for packaging a medical instrument or appliance such as a syringe comprises placing the instrument or appliance between a mounting paper and a hot-melting plastics covering sheet and thermally sealing together the peripheral edges of the paper and sheet. However, when a low quality paper is used as the mounting paper, the mounting paper is not completely severed during opening of the package and it is necessary to tear away the remaining portion of the paper in an attempt to gain access to the packaged article. Apart from this inconvenience, fuzzy or downy fibers fall on the packaged article during the unpacking or tearing operation, which is clearly detrimental to the sterile condition of the article. In order to avoid such a situation, a high quality paper or impregnated paper is generally used instead, and attempts have been made to apply an adhesive at intervals to the portion of the mounting paper bonded to the covering sheet, so that the area of the bonded portions can be restricted or the adhesive strength of the overall bond can be weakened. However, when a high quality or impregnated paper is employed, the package becomes undesirably expensive to manufacture. Where the adhesive is applied at intervals to the mounting paper, the adhesive is likely to deteriorate with time, etc. Moreover, the bonding of polyethylene

sheet to paper using an adhesive gives rise to instability in the strength of the bonds so formed.

It is also known to form a package by applying a thermoplastic coating to the peripheral surface portion of a first sheet, applying a porous coating to the corresponding peripheral surface portion of a second sheet, the porous coating having a higher melting point than the thermoplastic coating, and thermally sealing together these two sheets. In this case, however, it is technically difficult to apply the porous coating. If the porous coating is applied to paper, then poor bonding strength results. Furthermore, if proper temperature control is not maintained during thermal sealing together of the two sheets, the shape of the pores is deformed or destroyed at the high temperature involved. When the shape of the pores is destroyed, the sheets are firmly sealed through the respective coatings and difficulty is experienced in separating them during opening of the package.

According to this invention, there is provided a package for an article such as a surgical instrument, comprising first and second sheets receiving an article therebetween, said first sheet comprising a paper layer and a thermosetting plastics layer thereon, said thermosetting plastics layer extending over a peripheral portion of said paper layer and having a plurality of cutouts therein exposing underlying areas of said paper layer, and said second sheet comprising a layer of thermoplastic material, wherein said thermosetting layer on said peripheral portion of said first sheet is in contact with a peripheral portion of said thermoplastic material layer of said second sheet, said thermoplastic material of said second sheet extending through said cutouts in said thermosetting plastics layer and being bonded to said ex-

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posed underlying areas of said paper layer.

This invention can be more fully understood from the following description of an embodiment thereof, given by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a package according to this invention;

Fig. 2 is a partial cross sectional view of the package in which a syringe is partly shown;

Fig. 3 is a partial cross sectional view showing a paper layer and an outer covering of the package;

Figs. 4 to 7 are plan views of different thermosetting plastics layers applicable to the paper layer of the package of Fig. 1;

Fig. 8 is a partial cross sectional view showing the paper layer and outer covering of the package of Fig. 1; and

Fig. 9 is a partially enlarged view of Fig. 8.

As will be evident from Fig. 1 the package comprises a first sheet including a mounting paper 1 and a second sheet including an outer covering 5.

A surgical instrument such as a syringe 4 is enclosed, as shown in Fig. 2, between the mounting paper 1 and the outer covering of the package, and the peripheral portions of the paper and covering are heat sealed together.

During the unpacking operation, it is only necessary to peel apart the end section 8 as shown in Fig. 2.

A thermosetting plastics layer 2 having a plurality of cutouts or bores 3, as shown in Figs. 4 to 7, is applied to the mounting paper 1. To facilitate detachment of the outer covering 5 from the mounting paper 1 in the section 8, the cutouts 3 are preferably in a geometrical, angular form as shown, for example, in Fig. 6. The thermosetting plastics layer 2 may be, for example, of epoxy resin, unsaturated polyester, etc. Various techniques may be used to provide the mounting paper 1 with a thermosetting plastics layer having cutouts or bores. For example, a corresponding bore pattern provided on a drum for offset printing may be easily transferred to a mounting paper. A screen printing method etc. may also be used for this purpose.

Since the thermosetting plastics, when cured, is firmly bonded to the mounting paper, a strong bond is obtained, unlike that obtained with a thermoplastic resin. The thermosetting plastics layer 2 is applied to end section 8 which extends from the end of the package to a location at which a packaged article can be removed from the package. The remaining thermosetting plastics-free section of the mounting paper and the corresponding thermoplastic outer covering are thermally

sealed together to form a strong bond therebetween. In this way, thermosetting plastics can be saved by a corresponding amount.

The outer covering 5 is made of a thermoplastic resin such as polypropylene, polycarbonate, saturated polymer, etc. As shown in Fig. 3 a thermoplastic layer 6 for thermal sealing is provided over the entire inner surface of the covering. When the plastics layer 6 is thermally fused to form a bond with the thermosetting resin, the plastics layer 6 should preferably have a lower melting point than that of the covering 5.

To enclose a surgical instrument or appliance in the above described package, the instrument or appliance is first placed between the mounting paper 1 and the outer covering 5.

The peripheral portion of the covering 5 is then heat sealed to the corresponding portion of the mounting paper 1. During this heat sealing operation the plastics layer 6 is softened and local areas thereof pass into and through the cutouts 3 in the plastics layer 2 and contact and become bonded directly to the exposed portions of the mounting paper 1. Since the thermosetting plastics layer 2 is not susceptible to heat, the shape of the cutouts is not deformed. Thus the surface of the mounting paper is bonded to the covering only by the above referred to directly bonded portions.

From the point of view of sterility, the above described package is more germ-proof than the conventional package, in which a porous, thermoplastic coating is applied to the sheet, since in the latter there is always the probability of germs entering the contacted areas between the thermoplastic coatings and between the thermoplastic layer and the thermosetting plastics layer.

Where a package is sterilized by ethylene oxide etc., the sterilizing gas penetrates the exposed portions of the mounting paper and a more rapid sterilization can be attained with the above described package according to this invention than in the case where a thermosetting plastics coating is applied to the entire surface of the mounting paper.

The covering is easily removed from the mounting paper by peeling off the end section of the covering. Since the plastics layer 2 is bonded to the surface of the mounting paper, the sealed portion formed between the mounting paper and the plastics layer 6 is retained as its peripheral area by tension in the thermosetting plastics layer 2.

When the covering is removed from the mounting paper, as shown in Figs 8 and 9,

the removal is smoothly effected without peeling of the mounting paper as a whole and is stopped at any suitable location at which the contents of the package can be easily removed. As is seen in Fig. 9, only a very small portion (1) of the paper 1 is peeled off.

When the section 8 is provided at the extremity of the package, the outer covering 5 is bent, as shown in Fig. 2, to seal or intimately contact the end edge of the mounting paper. This arrangement prevents infiltration of germs and, during the unpacking operation, access of germs to the sealed portion of the packaged article. Thus, a very sterile package can be obtained.

In addition, a moisture-proof, sterilizing gas-pervious plastics film 9 may be intimately bonded, as shown in Figs. 2 and 3, to the outer surface of the mounting sheet, thus preventing swelling of the mounting paper due to moisture and infiltration of germs due to moisture.

It will be appreciated that the invention is also applicable to other types of packages, such for example as "blister packages".

As will be evident from the foregoing, the above described package constitutes a significant departure from, and has advantages over, the known package, by applying to the mounting paper a thermosetting plastics layer having a multi-cut-out pattern. This arrangement prevents unsatisfactory removal of the mounting paper from the covering, as is often encountered with known packages. Furthermore, the package can be manufactured economically without the need for employing, as a mounting paper, a high quality paper or an impregnated paper.

#### WHAT WE CLAIM IS:—

1. A package for an article such as a

surgical instrument, comprising first and second sheets receiving an article therebetween, said first sheet comprising a paper layer and a thermosetting plastics layer thereon, said thermosetting plastics layer extending over a peripheral portion of said paper layer and having a plurality of cutouts therein exposing underlying areas of said paper layer, and said second sheet comprising a layer of thermoplastic material, wherein said thermosetting layer on said peripheral portion of said first sheet is in contact with a peripheral portion of said thermoplastic material layer of said second sheet, said thermoplastic material of said second sheet extending through said cutouts in said thermosetting plastics layer and being bonded to said exposed underlying areas of said paper layer.

2. A package as claimed in claim 1, wherein said second sheet includes an outer covering layer on which said thermoplastic layer is formed.

3. A package as claimed in claim 1 or 2, wherein said first sheet includes an outer moisture-proof plastics film provided on said paper layer.

4. A package as claimed in any one of the preceding claims, wherein said cutouts are of an angular configuration.

5. A package as claimed in any one of the preceding claims, wherein said thermoplastic material layer is turned down along an exposed edge of said paper layer to intimately contact and bond to said exposed edge of said paper layer.

6. A package substantially as hereinbefore described with reference to the accompanying drawings.

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FIG. 1

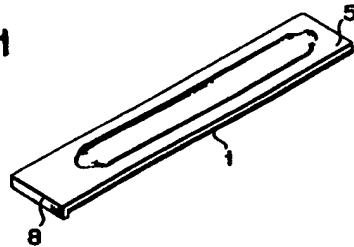


FIG. 2

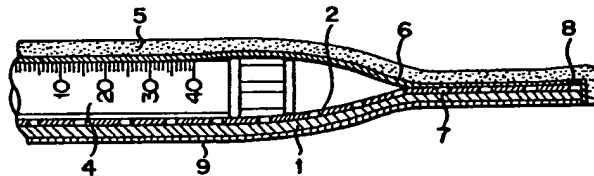
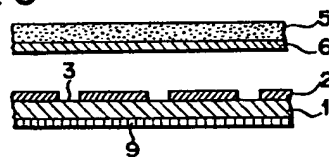


FIG. 3



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FIG. 4

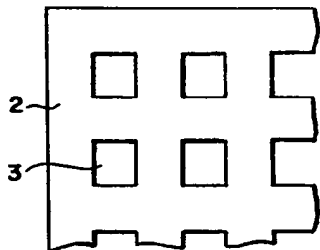


FIG. 5

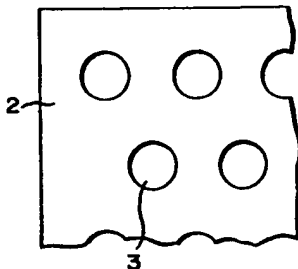


FIG. 6

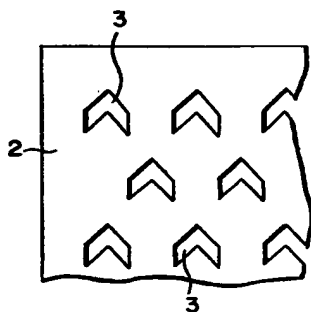


FIG. 7

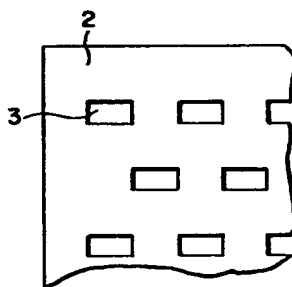


FIG. 8

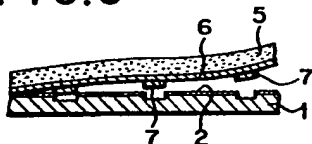


FIG. 9

